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System for the Transportation of Construction Machines, Preferably Excavators.

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This invention relates to a system for the transportation of construction machines, preferably excavators.

To transport a construction machine, such as an excavator, from construction site 1 to construction site 2, there are basically two possibilities. For small distances, a mobile excavator can drive on the street if it is has the necessary traffic permit. For longer distances, or if the construction machine lacks a traffic permit, as is the case with crawler excavators, the machine is transported by a low loader. Such low loaders are used in many other applications as well. A low loader has a platform supporting the weight of the device. The disadvantage is that an additional low loader needs to be procured for transport of construction machines. In addition, there are frequently problems with the overall height, since the height of the low loader must be added to that of construction machine. In particular, the transportation of excavators often results in exceeding the maximum permissible overall height. Moreover, the use of known low loaders often results in weight problems, since the maximum permissible total weight is often exceeded.

The purpose of this invention is to provide a system for the transportation of construction machines, preferably excavators, so that the excavator can be transported in such a way that the overall height and total weight are easier to deal with. In addition, the system should be as cost-efficient and simple as possible, since the complete system can be used for variable modes of transportation.

According to this invention, the purpose is achieved through a combination of the characteristics of Claim 1. Accordingly, a system is created for the transportation of construction machines, preferably excavators, with a front subassembly, which can be coupled to a tractor vehicle, and a rear subassembly, whereby the construction machine itself can be coupled to the front and rear subassemblies to form a single transportation unit. This clearly dispenses with the need for the usual loading platform on a deep loader. The framework of the construction machine itself replaces the loading platform. By means of coupling devices suitably arranged on the front and rear subassemblies, the entire system can be joined together into a single transportation unit.

Advantageous embodiments of the invention are expressed in the sub-claims following the main claim.

According to the sub-claims, the front subassembly and/or rear subassembly may include truck-type undercarriages with one or more axles. The choice of the number of axles depends on the total weight of the construction machine to be coupled.

According to an especially advantageous embodiment of the invention, the assembly can take the form of a semitrailer, with a front subassembly featuring an ordinary trailer coupler for a semitrailer in this variation.

Another especially advantageous embodiment of the invention comprises self-contained front and rear subassemblies that may be raised and lowered, whereby the construction machine may be coupled or locked by raising the subassemblies.

Finally, the front and rear subassemblies may include pneumatic cushioning to raise and lower them. Instead of pneumatic cushioning, hydraulic cushioning may also be used.

A modular system of the transportation system is expressed by sub-claims 6 through 8. In this case, instead of the construction machine, an intermediate part that forms a loading platform can be connected. The intermediate part may be, for example, a high-bed for a platform low loader or a low-bed for that type of platform low loader. This results in a modular system with a variable mode of using the transportation system. Thus, the front and rear subassembly may be coupled directly to the construction machine in order to transport it. Alternatively, the front subassembly and rear subassembly may also be combined with the usual high-bed or low-bed of a platform loader, in order to perform other transportation functions. Depending on the type of transportation, front or rear subassemblies with one or more of axles may be selected.

Other details and advantages of the invention are illustrated more precisely in a drawing of the sample embodiments. They show:

Fig. 1: a schematic side view of a transportation system according to the invention with a coupled excavator

Fig. 2: a schematic representation of a modular transportation system, represented in single parts

Fig. 3:

a-f: Various combinations of the transportation system modules represented in Fig. 2

Fig. 1 shows a transportation system 10 according to the invention in its assembled state. It comprises a mobile excavator 12 of standard design, connected in the front and rear part of its undercarriage 14 by locking units 16 and 18, which are not represented here in detail. Especially for long-distance transportation, the excavator 12 may be joined into a single transportation unit with the forward subassembly 20 and rear subassembly 22, wherein the locking function is provided by locking units 16 and 18. In the sample embodiment illustrated here, the front subassembly 20 is built as a single-axle truck-type undercarriage, connectable in the usual manner by a semi-trailer coupler to a tractor vehicle. The truck-type undercarriage of the front subassembly 20 is built in a steerable manner not depicted in detail here but well-known in the current state of the art. The rear subassembly 22 is also formed of a single-axle truck-type undercarriage,

Instead of the single-axle truck-type undercarriages 20 and 22, as shown in Fig. 2, multi-axle truck-type undercarriages may also be used, such as the two-axle truck-type undercarriages 28 and 30. A semi-trailer module 26 can also be integrated if desired (see Fig. 2).

The front subassembly 20 and the rear subassembly 22 are built in a self-contained manner, and preferably capable of being raised and lowered, whereby by raising the subassembly it is possible to couple and/or lock the construction machine. Such raising and lowering could be performed, for example, by means of air cushioning or hydraulic cushioning in a manner not illustrated here.

An especially advantageous modular transportation system may be formed by using various inserts, as desired, instead of a construction machine such as the excavator 12 in the present case, in combination with front subassembly 20 or 26 or 28 and rear subassembly 22 or 30. In this manner, in place of the construction machine, it is possible to insert an intermediate part comprising a loading platform in the form of a high-bed 32

or low-bed 34. These possible combinations result in the constructions shown schematically in Fig. 3, illustrating a combination of a single-axle front subassembly 20 with a high-bed 32 and a single-axle rear subassembly 22 (Fig. 3a).

Fig. 3b): a single-axle front subassembly 20, a low-bed 34, in combination with a single-axle rear subassembly 22.

Fig. 3c): a single-axle front subassembly 20, a high-bed 32, in combination with a two-axle rear subassembly 30.

Fig. 3d): a single-axle front subassembly 20, a low-bed 34, in combination with a two-axle rear subassembly 30.

Fig. 3e): a two-axle front subassembly 28, in combination with a high-bed 32 and a two-axle rear subassembly 30.

Finally, Fig. 3f) shows the combination of a two-axle front subassembly 28 connected to a low-bed 34 and a two-axle rear subassembly 30.

This shows by a way of example a few possible combinations of the modular system.

Instead of the mobile excavator shown here coupled with the front subassembly and the rear subassembly, it is also possible, of course, to use the locking units to couple crawler excavators, wheel loaders, tiltdozers, loading tractors, road rollers, or other construction machines with their respective fittings for variable modes of transport.

The construction machine, for example the excavator shown in Fig. 1, could be coupled with the other parts of the transportation system in the following manner, by way of example.

The excavator is driven up against the rear subassembly 22. By means of air cushioning or hydraulic cushioning, the rear subassembly 22 is raised up into it and locked.

Then the front module is pushed in, and the module is raised up into it and locked. Finally, both subassemblies are brought into driving position, so that the excavator 12 attains the transportation position shown in Fig. 1, in which its front wheels are raised off the ground.

According to one possible embodiment of the invention, the subassemblies are solidly connected, but the subassemblies 20, 26, 28 or 22 and 30 may be equipped with a steering mechanism as desired, which may be a hydraulically, mechanically, or adhesion-guided steering system.